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IMPROVEMENT OF THE MISSISSIPPI RIVER.

REMARKS

OF

HON. RANDALL L. GIBSON,

OF LOUISIANA,

IN THE

HOUSE OF REPRESENTATIVES.

WASHINGTON.
1879.

Transportation
Library

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CIVILIAN.

HON. BENJAMIN HARRISON, INDIANA.

CIVIL ENGINEERS.

J. B. EADS, MISSOURI.

B. M. HARROD, LOUISIANA.

ARMY ENGINEERS.

LIEUT. COL. Q. A. GILLMORE.

MAJ. C. B. COMSTOCK.

MAJ. CHAS. R. SUTER.

COAST AND GEODETIC SURVEY.

HENRY MITCHELL.

In the House of Representatives, May 10, 1879.—Read twice, referred to the Committee on Levees and Improvement of the Mississippi River, and ordered to be printed.

Mr. GIBSON, by unanimous consent, introduced the following bill:

A bill to provide for the appointment of a "Mississippi River Commission" for the improvement of said river from the Head of the Passes near its mouth to its headwaters.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That a commission is hereby created, to be called "The Mississippi River Commission," to consist of five members.

SEC. 2. The President of the United States shall, by and with the advice and consent of the Senate, appoint five commissioners, three of whom shall be selected from the Engineer Corps of the Army and two from civil life. And any vacancy which may occur in the commission shall in like manner be filled by the President of the United States; and he shall designate one of the commissioners appointed from the Engineer Corps of the Army to be president of the commission. The commissioners appointed from the Engineer Corps of the Army shall receive no other pay or compensation than is now allowed them by law, and the other two commissioners shall receive as pay and compensation for their services each the sum of \$3,000 per annum; and the commissioners appointed under this act shall remain in office subject to removal by the President of the United States.

SEC. 3. It shall be the duty of said commission to direct and complete such surveys of said river, between the Head of the Passes near its mouth to its headwaters as may now be in progress, and to make such additional surveys, examinations, and investigations, topographical, hydrographical, and hydrometrical, of said river and its tributaries, as may be deemed necessary by said commission to carry out the objects of this act. And to enable said commission to complete such surveys, examinations, and investigations, the Secretary of War shall, when requested by said commission, detail from the Engineer Corps of the Army such officers and men as may be necessary, and shall place in the charge and for the use of said commission such vessel or vessels and such machinery and instruments as may be under his control and may be deemed necessary; and the said commission may, with the approval of the Secretary of War, employ such additional force and assistants, and provide, by purchase or otherwise, such vessels or boats and such instruments and means as may be deemed necessary.

SEC. 4. It shall be the duty of said commission to take into consideration and mature such plan or plans and estimates as will correct, permanently locate, and deepen the channel and protect the banks of the Mississippi River; improve and give safety and ease to the navigation thereof; prevent destructive floods; promote and facilitate commerce, trade, and the postal service; and when so prepared and matured, to submit to the Secretary of War a full and detailed report of their proceedings and actions, and of such plans, with estimates of the cost thereof, for the purposes aforesaid, to be by him transmitted to Congress: *Provided*, That the commission shall report in full upon the practicability, feasibility, and probable cost of the various plans known as the jetty system, the levee system, and the outlet system, as well as upon such others as they may deem necessary.

SEC. 5. The said commission may, prior to the completion of all surveys and examinations contemplated by this act, prepare and submit to the Secretary of War plans, specifications, and estimates of costs for such immediate works as, in the judgment of said commission, may constitute a part of the general system of works herein contemplated, to be by him transmitted to Congress.

SEC. 6. The Secretary of War may detail from the Engineer Corps of the Army of the United States any officer who may be selected and recommended by said commission to act as secretary of said commission.

SEC. 7. The Secretary of War is hereby authorized to expend the sum of \$175,000 for the payment of the salaries herein provided for, and of the necessary expenses incurred in the completion of such surveys as may now be in progress, and of such additional surveys, examinations, and investigations as may be deemed necessary, and in maturing and perfecting and reporting the plans and estimates, and the plans, specifications, and estimates contemplated by this act, as herein provided for; and said sum is hereby appropriated for said purposes out of any money in the Treasury not otherwise appropriated.

[PUBLIC—No. 34.]

An act to provide for the appointment of a "Mississippi River Commission" for the improvement of said river from the Head of the Passes near its mouth to its headwaters.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That a commission is hereby created, to be called "The Mississippi River Commission," to consist of seven members.

SEC. 2. The President of the United States shall, by and with the advice and consent of the Senate, appoint seven commissioners, three of whom shall be selected from the Engineer Corps of the Army, one from the Coast and Geodetic Survey, and three from civil life, two of whom shall be civil engineers. And any vacancy which may occur in the commission shall in like manner be filled by the President of the United States; and he shall designate one of the commissioners appointed from the Engineer Corps of the Army to be president of the commission. The commissioners appointed from the Engineer Corps of the Army and the Coast and Geodetic Survey shall receive no other pay or compensation than is now allowed them by law, and the other three commissioners shall receive as pay and compensation for their services each the sum of \$3 000 per annum; and the commissioners appointed under this act shall remain in office subject to removal by the President of the United States.

SEC. 3. It shall be the duty of said commission to direct and complete such surveys of said river, between the Head of the Passes near its mouth to its headwaters as may now be in progress, and to make such additional surveys, examinations, and investigations, topographical, hydrographical, and hydrometrical, of said river and its tributaries, as may be deemed necessary by said commission to carry out the objects of this act. And to enable said commission to complete such surveys, examinations, and investigations, the Secretary of War shall, when requested by said commission, detail from the Engineer Corps of the Army such officers and men as may be necessary, and shall place in the charge and for the use of said commission such vessel or vessels and such machinery and instruments as may be under his control and may be deemed necessary. And the Secretary of the Treasury shall, when requested by said commission, in like manner detail from the Coast and Geodetic Survey such officers and men as may be necessary, and shall place in the charge and for the use of said commission such vessel or vessels and such machinery and instruments as may be under his control and may be deemed necessary. And the said commission may, with the approval of the Secretary of War, employ such additional force and assistants, and provide, by purchase or otherwise, such vessels or boats and such instruments and means as may be deemed necessary.

SEC. 4. It shall be the duty of said commission to take into consideration and mature such plan or plans and estimates as will correct, permanently locate, and deepen the channel and protect the banks of the Mississippi River; improve and give safety and ease to the navigation thereof; prevent destructive floods; promote and facilitate commerce, trade, and the postal service; and when so prepared and matured, to submit to the Secretary of War a full and detailed report of their proceedings and actions, and of such plans, with estimates of the cost thereof, for the purposes aforesaid, to be by him transmitted to Congress: *Provided*, That the commission shall report in full upon the practicability, feasibility, and probable cost of the various plans known as the jetty system, the levee system, and the outlet system, as well as upon such others as they deem necessary.

SEC. 5. The said commission may, prior to the completion of all the surveys and examinations contemplated by this act, prepare, and submit to the Secretary of War plans, specifications, and estimates of costs for such immediate works as, in the judgment of said commission, may constitute a part of the general system of works herein contemplated, to be by him transmitted to Congress.

SEC. 6. The Secretary of War may detail from the Engineer Corps of the Army of the United States an officer to act as secretary of said commission.

SEC. 7. The Secretary of War is hereby authorized to expend the sum of \$175,000, or so much thereof as may be necessary, for the payment of the salaries herein provided for, and of the necessary expenses incurred in the completion of such surveys as may now be in progress, and of such additional surveys, examinations, and investigations as may be deemed necessary, reporting the plans and estimates, and the plans, specifications, and estimates contemplated by this act, as herein provided for; and said sum is hereby appropriated for said purposes out of any money in the Treasury not otherwise appropriated.

Approved June 28, 1879.

REMARKS
OF
HON. RANDALL L. GIBSON.

SATURDAY, June 21, 1879.

Mr. GIBSON said:

Mr. SPEAKER: I will endeavor in a very few words to explain the scope of the bill as originally passed by this House and the modifications made by the amendments of the Senate.

Let me say that the bill was passed by this House nearly three weeks ago, with only twenty votes against it, and was returned to us from the Senate with only four adverse votes of that body. As it passed the House, it provided for the appointment of a commission to be called "The Mississippi River Commission" to consist of five members, three of whom were to be selected from the Engineer Corps of the Army and two from civil life, and the President was authorized to designate one of the commissioners from the Engineer Corps to be the president of the commission. Now, the amendments made by the Senate provide that in addition to these five members one shall also be appointed from the Coast and Geodetic Survey and one from civil life.

It is proposed to concur in these amendments of the Senate. I should prefer the bill as originally drawn, but I can see no weighty objections to the proposed alterations. It will be seen that they relate merely to the commission, increasing its number from five to seven members. No changes have been made in the duties imposed upon the commission.

Mr. Speaker, I am persuaded that every gentleman in this House who has made himself acquainted with the vast interests of the Mississippi Valley and with the difficulties to be overcome in the protection and advancement of those interests will hesitate long before he will throw himself in opposition to this bill.

The Mississippi River is a national river, the grandest highway of commerce in the world. And yet while the Federal Government has with unstinted liberality made appropriations for our ocean front and lakes and upland rivers, nothing has been done for our great inland sea. You have expended enormous sums for harbors and water-gaps upon our eastern seaboard and you support a navy to protect our foreign commerce upon every sea under the sun. You have established sheltering harbors and piers upon the lakes at the cost of millions. You appropriated ten millions to unite the Wisconsin and Fox Rivers and four and a half millions to build a canal around the Des Moines Rapids. These are but a few instances. I believe every dollar so expended adds to the wealth, comfort, and happiness of the American people.

But why is it that nothing, absolutely nothing, in comparison with the interests involved, has been done for the Lower Mississippi, from

Cairo to New Orleans, a distance of one thousand miles, making a coast front of two thousand miles on our great inland sea, whose commerce and trade even now exceed in value our whole foreign commerce! It is only within the last three years that we have been able to secure deep water at the mouth of the river. Experiment after experiment was made until finally a plan was suggested and adopted that proved successful. We are to-day confronted with difficulties apparently as invincible along the route of the river as those that barred its gateway. What are they?

In the first place, official reports show that during several months in every year immense sand-bars and snags close the navigation of the river as effectually as if artificial dams were constructed across its channel.

In the second place, official reports show that at other seasons the river rises over its banks throughout the alluvial region and spreads out over the country for forty to sixty miles—becomes a mighty, roaring torrent—destructive not only to human life and property upon its borders, but destructive to the commerce and trade upon its waters. The report of the engineers show that these floods cause changes of the channel itself, and the towns of Vicksburgh, Vidalia, and Natchez are now threatened with being cut off entirely from the main channel of the river, and unless something be done to correct its course these once thriving towns will be isolated and become interior towns, not on the banks of the river, but upon quiet inland lakes without communication with the river.

In such seasons the largest boats propelled by steam are sometimes destroyed and often detained several days by the extraordinary obstacles they encounter, but that countless fleet of smaller boats, barges, and flatboats, propelled by the current of the river itself, are absolutely at its mercy and are sometimes borne into the adjacent forests and wrecked, or whelmed and destroyed in the furious eddies and counter-currents.

At night and in storms there is absolutely no protection. It is estimated that these extraordinary perils impose a tax of not less than \$10,000,000 annually on the increased rates of insurance alone. We know what the difficulties are. They have been surveyed and reports made of them to Congress. But no complete and comprehensive system for their removal has been submitted to this House or to the country.

This commission is created with the hope that they may devise some plan, economical, feasible, and complete, that shall give us deep water at all seasons of the year, and prevent these destructive floods so ruinous not only to the country through which it flows, but to the mighty commerce that carries the productions of the teeming millions who inhabit the great valley to the markets of the world and brings back in exchange the wealth of other countries.

Mr. Speaker, I do not, I cannot believe any gentleman will be disposed to vote against reasonable and just appropriations for wing-dams, jetties, and levees, should this commission, after a thorough and scientific examination of the subject, report that these are the appropriate and necessary instrumentalities to deepen and correct the channel, to prevent destructive floods, to afford safety and ease to navigation, and facilities to trade and commerce upon our great inland sea; that they are, in fact, to the Mississippi River what water-gaps, sheltering piers and harbors, and light-houses and beacons and buoys are to the sea and lake coasts.

Would you decline such appropriations so clearly constitutional under the power to regulate commerce, when they are smaller in pro-

portion to the commercial interest at stake than upon the ocean or the lake, because at the same time they would protect the hardworking and industrious people in the mighty valley against overflows, or because they would reclaim the most productive region on this continent and secure to it an intelligent, vigorous, population to develop its inexhaustible resources and contribute to the strength and glory of our country!

TUESDAY, July 1, 1879.

Mr. GIBSON. I move to suspend the rules and put upon its passage the bill (H. R. No. 2383) to amend an act entitled "An act to provide for the appointment of a Mississippi River Commission, for the improvement of said river from the head of the passes near its mouth to its headwaters."

The bill amends the second section of the act of June 26, 1879, by striking out the words "appointed from the Engineer Corps of the Army," after the word "commissioners," where it occurs the second time in said section; so that it will read:

He (the President) shall designate one of the commissioners to be president of the commission.

Mr. DUNNELL. I think there ought to be some explanation of this bill.

Mr. GIBSON. I will make the explanation, with the permission of the House.

The bill constituting the commission on the Mississippi River, while providing for the appointment of two civil engineers, one citizen, and three engineers from the Army, limits the choice of the President in the selection of the presidency of the commission to one of the members thereof from the Engineer Corps of the Army. This, in effect, imposes upon the other members of the commission the disability and disqualifies them, or any one of them, no matter what his merit, in the event of a vacancy, from ever becoming the head of this important commission.

This is regarded by the gentlemen thus excluded as an invidious distinction against them. It was the expectation of the friends of the original bill that this feature would be amended before it became a law; but circumstances transpired to prevent it. What justice is there in this disqualification? It is well known that the conditions of the Lower Mississippi River are novel and difficult, and that practical knowledge as well as experience are quite as much demanded as the engineering taught in our Military Academy.

Nay, more than this, eminent engineers, graduates of West Point, but who are no longer in the Army, might feel the exclusion put upon them by this restriction when called upon to serve under those who were once their juniors and subordinates. There is no justice or propriety in this disabling clause in the bill. Every member of this commission should feel and be made to feel that the way is clear for him, is open to him, by energy, by the exhibition of superior character and ability—it may be of genius—to rise to the first and highest place on the commission.

At all events, we should not impose an arbitrary barrier against any one of the members of the commission or upon the discretion of the Executive. It is not necessary or just or proper. I know this will be the sense of this House, nay of the Congress, when the issue is once made. I trust in the mean time the civil engineers of the country and the civilian who may be selected to be members of this commission may be willing for a short period to sacrifice *amour propre*

and mere personal considerations to that profound sense of duty to the country that should animate every man in the public service. There is such a sentiment as genuine patriotism, lifting men above mere placemen and out of mere personal or professional pride. The people of the Mississippi Valley will appreciate and applaud the men who shall dedicate themselves unselfishly to the development of their great interests.

WEDNESDAY, February 5, 1879.

The House having under consideration the bill (H. R. No. 4318) to provide for the organization of the Mississippi River Improvement Commission, and for the correction, permanent location, and deepening of the channel and the improvement of the navigation of said Mississippi River, and the protection of its alluvial lands—

Mr. GIBSON said:

Mr. SPEAKER: I shall not attempt, at this stage of the discussion to do more than to state as briefly and as clearly as I can some of the reasons which should commend the bill reported from the committee on the improvement of the Mississippi River to the favorable consideration of this House, and to utter an emphatic protest against the amendment offered by the gentleman from Illinois, [Mr. SPARKS,] the effect of which would be fatal to every interest concerned. This measure constitutes a board of able military and civil engineers to make and complete a critical survey, and only hydrographical and hydrometrical, but topographical, of the river and its banks, and to take into consideration and test in the light of facts and science all theories that may be presented to them; and finally to report what, in their judgment, is the best plan for its improvement. Only partial surveys have hitherto been made, and every engineer engaged in the work has urged that such a commission should be appointed.

No river in the world presents phenomena so peculiar and extraordinary. It is not simply a great stream flowing to the sea, but it possesses ceaseless activity, is the architect of the continent, forever carrying on its work of destruction and reconstruction. The ablest investigators hold that it is three former rivers now united in one, that once forming a series of great lakes from the Ohio to the mouth of the Wisconsin, it cut through the chain of the Ozark Mountains and forced its passage to the Gulf of Mexico. At first a clear and bold stream passing over mountain barriers and roaring cataracts, but finally having worn away the rocky strata which formed its bed, opened out into an inland sea, bringing down the body of the hills and mountains to build that vast region which surpasses in extent, in fertility, and productiveness any other portion of our country, or indeed of the habitable globe, not excepting the valley of the Nile. Unlike other rivers it forms its own bed, it makes its own channel, it determines its own course, so that the country through which it flows is inseparably connected with the regimen of the river itself, and any plan for the improvement of its navigation would be faulty and imperfect unless it also embraced the treatment of its banks and the alluvial through which it passes.

But while the phenomena appear discordant and irreconcilable we know from analogy that they are controlled by and are obedient to fixed laws. This commission is established for the purpose of ascertaining these laws. When once fully understood we shall become masters of the forces to which all these phenomena are subordinate, and with this knowledge we shall be able to adopt a plan so comprehensive and satisfactory as to command universal support.

There are two distinct phenomena. At certain seasons of the year

the water subsides, the channel is blocked up by snags and sand-bars, and for a great distance there is only four and a half to eight feet depth. This condition continues not for a few days or a few weeks but for several months during every year, interrupting trade and commerce and making its navigation difficult and perilous; the largest and costliest boats in which great sums are invested and that give employment to thousands of people, are compelled to lie idle; the navigation of the river is almost as effectually closed as if artificial dams were built across its bed. The recent able report of Major Suter shows how serious and numerous these obstacles are.

Then, again, at other seasons the opposite condition prevails. On December 22, 1822, General S. Bernard and J. G. Totten submitted a report, after an examination of the river, to Major-General Macomb, in which they so accurately describe it in high water that I will quote from them:

When the floods of the Mississippi have obtained their greatest elevation the whole valley through which it runs is submerged and presents a breadth of water in some places fifty or sixty miles. * * * While the waters of this river are over its banks, the operation of the current being in proportion to its elevation and consequent increase of velocity, the changes which are produced in the bed of the river are great, sudden, and numerous. Then are produced those multiplied turns and elbows which so strikingly characterize this great river, and which increase its channel to the double of what it would have been if the banks could have resisted its current. The corresponding concave parts of these turns are sometimes separated only by a very narrow neck, which being cut through by the waters, as often happens, present a new and navigable channel of perhaps a half mile in length in lieu of the old one of fifteen or twenty miles. The abandoned channel is entirely divided from the river except in floods, and on the west side, especially, becomes a lake.

This view has been confirmed by all subsequent observation and reports. A flood of this river through its alluvial region must not be confounded with its overflow in the highlands, or with a freshet in an upland stream. In both cases it is true property upon the banks is destroyed, crops, live stock, farming utensils, houses, the thrift and earnings of life's struggles, are swept away and the frugal and hard-working people are left in a pitiable and desolate condition; but when the Father of Waters swells into an inland sea fifty or sixty miles wide, covering the whole alluvial region, *the bed itself is often changed and its channel and course altered.* And in storms or at night there are no sheltering piers, no buoys, no light-houses for the shipping; they cannot be applied to these conditions so as to afford shelter or protection. Great boats propelled by steam are sometimes destroyed and often detained several days by the extraordinary obstacles they encounter; and smaller boats, barges and flatboats, propelled by the current of the river itself, are absolutely at its mercy and are borne sometimes into the forests of the adjacent country and lost or whelmed and destroyed in the furious eddies and surging counter-currents. *Navigation in such seasons is perilous, the cost of transportation is thereby increased, and insurance is doubled.* It is with these two distinct and different phenomena of the Mississippi River that we are called upon to deal.

First, what can be done to remove the snags and bars that fill its channel in seasons of low water and to secure the necessary depth for the carrying trade of this great outlet.

Secondly, what can be done to improve the navigation in the high stages of the river; to render the channel permanent, and to afford shelter and security to the shipping, and to facilitate trade and commerce. These are plain, practical propositions.

An opinion prevails that when you come to apply the constitutional power to regulate commerce to rivers, all you can do is to deepen their

channels or to overcome obstacles by building canals around them. Thus Congress appropriated ten millions to unite the Wisconsin and the Fox Rivers, and four and one-half millions to build a canal around the Des Moines Rapids—sums sufficient nearly for the improvement of the Lower Mississippi. But it will not do to regard the Mississippi as an ordinary river; it is in fact an inland sea, and its relations to the Constitution are analogous to those of the lakes and sea-coast. The first act passed by the Federal Government under the power to regulate commerce was not to deepen or widen channels—there was plenty of water on the Atlantic sea-board—but it was for the establishment and support of light-houses, beacons, buoys, and public piers, to guide in safety the mariner on his voyage against the dangers of capes, reefs, and shoals, and to point out the best and safest channel; in fact, to indicate the channel. Our coasts have been studded with such aids to navigation and commerce; we have constructed public piers, including harbors for protection where vessels might take shelter in storms. In all these instances it was not to secure deep water, but, in the language of the acts themselves, it was to render navigation “easy and safe.”

It is true that when the Constitution was made its framers had in contemplation the Atlantic coast only. A very small portion of our population had passed into the valley of the Mississippi, and none had reached the lakes. There was not a State wholly within the valley; the greater part of it, including the whole of its right bank and all on both banks below the thirty-first parallel, belonged to Spain, who claimed the exclusive right to navigate the river to the south of it, and a right in common with us to the residue. Steam had not then been applied to navigation, but the principles laid down in the Constitution are not confined to particular cases, but are broad, general, and comprehensive. It cannot be held now that we have the power to expend millions upon millions for the benefit of the trade and the commerce on our ocean fronts, lakes, and rivers in the uplands, but have not the power to do anything for the benefit of the people living upon the borders of the Mississippi River because its conditions are different and peculiar.

The tonnage built last year on the Mississippi River and its tributaries was 460 vessels, 68,928 tons; on the lakes 101 vessels, 11,438 tons; and on the Atlantic and Pacific seaboard 697 vessels, 155,138 tons.

The carrying trade upon this great internal artery and its tributaries exceeds our whole foreign trade, and is rapidly increasing, so that within a few years it shall surpass all other avenues of commerce in the country put together. It was acquired by treaty and paid for out of the common treasure of the people of the whole country; it was dedicated, not only by the terms of the treaty but by the conditions of the bill for the admission of the riparian States, to the untaxed and free enjoyment of the people of the country, so that in every sense the Mississippi River is a national highway. The States bordering upon it can exercise no jurisdiction over it. Chief-Justice Taney says, in *The propeller Genesee Chief et al. vs. Fitzhugh et al.*:

In regard to the power to regulate commerce “the admiralty and maritime jurisdiction granted to the Federal Government by the Constitution of the United States is not limited to tide-waters, but extends to all public navigable lakes or rivers where commerce is carried on between different States or with a foreign nation. There were no navigable waters upon which commerce was carried on except tide-water until the valley of the Mississippi was settled and cultivated and steamboats invented.”

As to the limitation of maritime jurisdiction by the tide-water in England he says:

This definition in England was a sound and reasonable one, because there was no navigable stream in the country beyond the ebb and flow of the tide.

Whether we consider, therefore, the magnitude of the interest involved, or the political aspects of the question, or the decision of the Supreme Court, it is clear that the power to regulate commerce applies with as full force to the Mississippi River, and to the construction of the proper appliances to give it a permanent channel and deep water, and to afford protection and shelter, "*to secure ease and safety*," in the language of the old acts, and facilities to its trade and commerce, as to the lakes and seaboard. And if it can be shown that levees and dikes and jetties are as essential to accomplish these beneficent purposes as water-gaps and sheltering-piers, why should not the Federal Government undertake their construction?

We have listened in the course of this debate to able and strenuous advocates of the outlet theory. The honorable member from Texas [Mr. REAGAN] insists that it should be examined; the veteran member from Massachusetts, [Mr. BANKS], who has spoken with a patriotism as broad as his country, also insists that this view should be thoroughly considered. I cordially concur in this opinion. Let the friends of this plan be heard, as I have no doubt they will be with great respect by the commission. Others advocate the plan of making immense reservoirs in the mountainous regions in which the waters shall be confined so as to prevent an excess or a scarcity in the river. This was the favorite plan of the Emperor Napoleon for the treatment of the river Rhone. Others again insist that the best plan is to confine the water to a narrow channel where it is unduly extended and shallow by jetties, where they can be applied, or by levees where they cannot be applied. A jetty is a levee in the popular sense of the word within the bed or channel of the river, while a levee is a jetty on the bank of the stream. This plan rests upon the theory that in sedimentary rivers, in the Mississippi particularly, as the water is confined the velocity and depth is increased and the surface lowered, and that thus two great objects may be accomplished by one and the same method, namely, "*ease and safety*" to navigation and protection to the industrious people on its banks from the dreaded floods. The amendment of the gentleman from Illinois [Mr. SPARKS] would exclude from the consideration of this commission this theory. It appears to me that if we are to have a commission at all it should be left free and uninstructed; it should be permitted to take into consideration all plans, all theories, and to report to us the one that they may agree upon as the best to accomplish the purpose we have in view.

I have already stated that the conditions of the Mississippi River are novel and difficult, and that no complete survey has ever been made to the satisfaction of the engineers who have been engaged in the examination of that river. Let us, therefore, not hamper the commission about to be appointed by any instructions or views of our own, but afford them every facility in the great work of ascertaining the laws which control the river. We have before us the report of a board of engineers appointed to examine the jetties at one of the passes of the Mississippi River, dated January 20, 1879. This report furnishes ample food for reflection; it declares that the plan of Eads has passed from the field of experiment to a practical success. Upon what is this plan based? It simply runs out two parallel levees or jetties, like sheltering piers, from the mouth of South Pass over the bar into the Gulf, thus compelling the water into a narrower channel, and the result has been that the increased velocity of the current

has scoured away the bar and given to the Mississippi Valley an open and unimpeded mouth to the sea.

In the month of January last a convention of the leading men connected with agriculture, commerce, and manufactures in the Mississippi Valley, assembled in New Orleans and passed a formal resolution declaring that the experiment which had secured deep water at the mouth of the river had more than repaid the cost of it within a single year by the benefits it had conferred upon the vast interests they represented, notwithstanding the deplorable calamity of the epidemic.

Now, what I desire to call attention to is the fact that the principle upon which the jetties are constructed is precisely the principle upon which the levee system rests. I hold that we cannot resist directly the momentum of the great river at its flood height, but that by directing its forces in its low stages we may alter its regimen and may compel it to do the work essential to the improvement of its navigation and to the protection of the people dwelling upon its banks; that these forces may be utilized, not by dispersion, but by concentrating them by levees and jetties and wing-dams in special directions and to effect particular purposes. Wherever the river is narrow all the engineers are agreed that there is deep water and no caving of the banks, and wherever the river is divided by islands or its channel is nuduly wide, there you will find sand-bars and shallow water, and whenever a crevasse occurs or an outlet is made the current is checked, the channel is filled with sediment, and the surface of the river elevated.

In the earliest report ever made, that of Generals Bernard and Totten, on December 22, 1822, they declare—

The only means which appear practicable to us, is the construction of dikes—they operate by diminishing the current above them, thus economizing the expanse of water, at the same time constraining the current to rush with greater velocity through the narrow spaces to be deepened.

George W. R. Bayley, a distinguished engineer, long a resident of Louisiana and a close and accurate observer, says:

The tendency of the levee system is to reduce instead of to elevate the river flood-line. A perfected levee system would tend to lessen the danger of inundations; the river channel would be accommodated to its necessities, and the danger or liability reduced to its minimum.

The action of water in slowly wearing channels thousands of feet deep through even the hardest primitive and volcanic rocks—as, for instance, through the immense cañons of Colorado—is too well known to be questioned. It is also so well known as to make denial useless that the action of the powerful Mississippi current upon the hard blue clay (whether alluvial or tertiary is not essential) which forms its bed, though comparatively slow as respects its action upon other strata, is sufficiently rapid to allow for and keep pace with the increase required for the gradual extensions of the levee system and the closure of the outlets.

All experience and observation show that where the Mississippi River current is checked from any cause and at any stage, but more especially when the river is falling, then a portion of the earthy matter held in suspension is dropped, and the more heavily charged the water is the greater the deposit.

The same laws govern in all sedimentary rivers, whether small or great. The first effect of an outlet is to lower the flood-line of a river, because time is required for readjustment of the river's regimen; but the ultimate effect will be the reverse, because the law is that the less the quantity of water flowing the greater is the slope required for its discharge at a given velocity.

It is certain that all sedimentary rivers adapt themselves to every change in their regimen. The Mississippi is no exception, notwithstanding that its vast magnitude makes even slight changes in it, as work of time. Its floods can be controlled by means of a levee system, but only the National Government is able to perfect and maintain such.

Outlets are worse than useless. * * * Reservoirs are impracticable. As to diversion of tributaries it would be useless, if practicable. Levees can most certainly be relied upon, and the object of this paper has been to demonstrate that levees alone are needed; that the only way to reduce the flood-line is to perfect the levee system.

In this opinion Professor Charles G. Forshey concurs, whose scientific ability and attainments are unsurpassed and whose practical knowledge of the river is unequalled. And there cannot be found a captain of a steamboat acquainted with the river by constant observation through a long series of years, or a resident upon its banks, who does not entertain this view. He says:

We conclude, what we should have inferred from hydrology, that the effect of confining the waters in the channel is not to raise, *but to depress the level.*

General J. G. Bernard, in a paper published in July, 1850, says:

It is pretty well established that certain relations exist between the configuration of the bed of a stream and the velocity of its current. This relation is the more discernable and capable of being subjected to calculation in rivers whose beds have been formed of materials brought down by their own currents; in other words, which have made and shaped their beds. If, from any cause, such as throwing off a portion of the water through a water-weir, the velocity of the current is diminished, it is no longer able to maintain its sediment in suspension, but will continue to deposit it in its channel until, through the elevation of its bed, its velocity again becomes what it was before it was disturbed, sufficient to maintain its sediment in permanent suspension. Now, it is a well-established principle in hydro-dynamics that the less the volume of water the greater the surface-slope required in order to maintain a given velocity.

Guglielmini laid down the same doctrine, when he declared that—

The greater the quantity of water that a river carries, the less will be its fall—that the greater the force of the stream, the less will be the slope of its bed.

These principles were observed and illustrated in the treatment of the Po, the Danube, and the Rhine. The traveler is filled with admiration at the results accomplished in the lovely valley of the Rhine. Where a few years ago was shallow water and vast tracts of country uncultivated and liable to overflow, you will now find excellent navigation and broad fields covered with vineyards, and the homes of a prosperous population. But in no country has the science of engineering won such complete mastery over the flow of waters as in Holland, or wrested both from rivers and the ocean such areas of fertile land and secured such admirable highways.

I am sure that the gentleman from Illinois, [Mr. SPARKS,] if it be shown to his satisfaction that levees and jetties are to the trade and commerce on this great river what light-houses, water-gaps, and sheltering-peers are on the lakes and ocean fronts, will not hesitate to vote an appropriation for their construction. A recent report of the leading engineers of the Army declares in effect that the improvement of the navigation of the river and protection of the country by levees are interdependent. I beg leave to call the attention of the House to a brief extract from this report:

The great obstacle to the improvement of the low-water navigation and to maintaining a levee system is one and the same for both, namely, the instability of the river from the caving of its banks. When this can be overcome by means not inordinately expensive (on which point we have treated more fully in our preliminary report on the subject of low-water navigation of the river) we may expect a deepened channel, a lowered high-water surface, and a stable river, the margins of which shall be securely cultivated, to the enormous development of the wealth and population of the region. *We believe, therefore, that the levee system, if undertaken, should be matured and developed in connection with the navigation improvement.*

I will not, Mr. Speaker, tax the forbearance of the House any longer. I shall ask to append to these remarks the report of the engineers, from which I have quoted, and my own letter upon this subject, as well as some views of Mr. Eads and of General Beauregard. No authorities could be introduced to this House with stronger titles to

your confidence than General Beauregard or Captain Eads, or those from whom I have quoted, all of whom unite to scientific attainments of the highest order much practical experience.

It is said, Mr. Speaker, by Reclus, in his work on the Earth, that the Amazon is the glory of the planet. I admit that this is true when we contemplate alone the majestic flow of its waters; but no man can dispute the supremacy of the Mississippi as a river of commerce. And there is but one Mississippi Valley on the globe. It is soon to be not only the main seat of our agriculture, but of our political empire. You may deny to the people of that valley to-day their just claims for the improvement of their great highway. You can but defer this beneficent work, for in the course of a few years the representatives of the valley will not be here to petition but to control the legislation of the country.

Why should you not improve the Mississippi? It belongs to no State; it cannot be monopolized; it is beyond the reach of corporations; it is the Nation's free highway; it is the natural outlet of a mighty valley fifteen hundred miles wide and two thousand miles long, the richest and largest in the world, penetrated by fifty thousand miles of boatable streams; it affords the cheapest navigation known, furnishing itself propelling power; a single steam-tug with barges will bring down more wheat than can be moved on fifteen hundred freight cars, and at half the cost. If the adjacent States could tax the tonnage upon its waters only as large as New York taxes the traffic on the Erie canal, the tax would yield ten times the sum every year required for its permanent improvement. It is the common property of all the people and their security against the railway corporations which absorb their profits and consume their substance.

We gather in population from all parts of the earth the restless, active, and vigorous, bringing their peculiar theories of religion, government, property, and social science, elements often of disorder and anarchy, menacing the stability and peace of society; but the stream of American life and civilization flows on, sometimes turbid, sometimes lashed into fury, exciting apprehension and alarm, but fenced in by the invincible barriers of the Constitution and laws—bears along, for the benefit of the present and of coming generations, these priceless institutions that combine freedom and order, liberty and law.

So the Father of Waters, gathering force and volume from countless tribute streams, now sweeps away, with its uncontrolled floods, the toil of generations, and baffles man's enterprise, hopes, and destiny; but, once made obedient to the genius of American engineering, it shall bear upon its bosom, in security and safety, the wealth and fortunes of the mightiest empire on the earth, and distribute benefits and blessings only to the teeming millions upon its shores and to every part of the habitable globe.

A.

WASHINGTON, November 17, 1878.

SIR: The supplemental instructions of General Humphreys, the Chief of Engineers, issued on the 13th instant to the board of engineers for the improvement of the Mississippi River, invite you "to the consideration of the effect of a permanent levee system throughout the length of the river below the mouth of the Ohio, not only upon its low-water navigation, but also of the benefits it would confer in affording

protection and giving needed facilities to shipping, commerce, and navigation in the high stages of the river." The Constitution provides (article 1, section 8) that "Congress shall have power to regulate commerce with foreign nations, and among the several States, and with the Indian tribes." That the grant of power over commerce is complete and absolute should not excite surprise when we reflect that it was mainly the object which led to the formation of the Federal Constitution. The first step was taken by Virginia on January 21, 1786, when she submitted to her sister States a formal proposition for the appointment of commissioners by each "to take into consideration the trade of the United States." And within one month after the Federal Government went into operation under the Constitution the First Congress passed "an act for the establishment and support of light-houses, beacons, buoys, and public piers," the object being, as recited in it, "to render navigation easy and safe."

At the outset there was some dispute among public men as to whether this power might be applied to internal improvements generally, but there never has been a doubt as to the unlimited jurisdiction of the Federal Government over commerce and of its power to legislate for its benefit. For half a century there has been a decided concurrence of the views of the ablest American statesmen on this subject, and the Government has expended large sums with the best possible results. Mr. Webster says: "Over whatever other interests of the country this Government may diffuse its benefits and its blessings, it will always be true as matter of historical fact that it had its origin in the necessities of commerce, and for its immediate object the relief of those necessities by removing their causes and by establishing a uniform and steady system." Mr. Calhoun says: "These provisions furnish conclusive proof that the object of the power was the increased safety and facility of commerce." President Jackson says: "The practice of defraying out of the Treasury the expenses incurred by the establishment and support of light-houses, beacons, buoys, and public piers within the bays, inlets, and harbors, and ports of the United States, to render the navigation thereof safe and easy, is co-eval with the adoption of the Constitution, and has been continued without interruption or dispute."

It may now be regarded as the fixed policy of the Government, sanctioned by our ablest statesmen and made operative upon a large scale at every session of Congress, to protect and aid and facilitate commerce in every possible manner. The methods by which this may be done upon our ocean and lake fronts, and even upon the rivers in the uplands, have caused but little difference of opinion. Estimates and surveys have been made with regularity, and Congress has appropriated large sums for their prompt and complete execution. Fortunately, there has been a happy concurrence between the engineers of the Government and the law-making power. Nearly \$9,000,000, authorized to be expended under the direction of the War Department for the benefit of our commerce, for the improvement of our rivers and harbors, was voted at the last session of the present Congress. It is proposed now to expend nearly \$2,000,000 upon Harlem or East River, lying wholly within the State of New York, in addition to the large amount appropriated for the harbor of that great metropolis. But while the Government is making these large expenditures with unstinted liberality for the commerce and trade on our ocean fronts and lakes and rivers in the uplands, not a dollar, in comparison, has been devoted to giving "ease or safety" or needed facilities to the commerce and trade upon that great inland sea from Cairo

the proper claims of trade and shipping and navigation. On the contrary, it may be urged with justice that the Federal Government, claiming and exercising control over the river as a great national highway, should regulate it so as not to injure the people living upon its banks—a people powerless, individually or as States, to exercise any jurisdiction over the river. All jurisdiction is forbidden to the States.

The very means which the adjacent States might employ in order to establish a uniform and complete system of levees are denied to them by the Federal Constitution. They can neither co-operate nor exercise their power over the subject when co-operation and joint jurisdiction are absolutely indispensable. The river is the property of the National Government, held for the benefit of the whole country. The ownership is unquestioned, complete, and absolute. The doctrine that the owners of property should so use it as not to injure that of others is of universal application. *Sic utere tuo ut non alienum ledas* is a legal maxim familiar to all jurists and publicists, and held to be binding upon governments as well as individuals. It is clearly within the constitutional power and duty of the Government, as well as promotive of the interest of the people of the whole country, that these vast regions should be protected from the devastations of the river by a uniform system of levees. We have bought vast tracts of country and conquered others in expensive wars. Why may we not bring the delta of the Mississippi within occupancy and settlement? It is true that a system of levees would not only give security against inundations that are destructive alike to the channel and navigation and trade upon the river and to the industrious people cultivating the soil in the valley, but that it would form the most effective barrier against disease—epidemics equally fatal to the health of the country. But these views are foreign to the purpose of this communication. I desire now to speak altogether in the interest of commerce and trade, the navigation and shipping upon the river, and the means for benefiting and improving them.

I have forbore to weary you with any statements of facts showing the vast interests involved. You are familiar with the resources of the mighty valley. Nor have I ventured to urge upon you any theory for the treatment of the river. I beg, however, in conclusion, to invite your attention to the following extract from a report made by those distinguished statesmen, James Gadsden and James Guthrie, after a full investigation of the whole subject in 1845, and submitted to Congress, with his approval, by John C. Calhoun: "Intimately connected with this subject is the improvement of the navigation of the Mississippi. The science of the engineer has been bewildered on the subject of the improvement of rivers. Those free from rock, and which, like the Mississippi, course through alluvial formations, inundating their banks, depositing and making the very soil through which they cut, are uncontrollable and most difficult of improvement. A great engineer in England, when substituting a canal for a river, is known to have exclaimed in explanation that 'rivers were made to feed canals.' The expenditures on the Mississippi thus far, if reports are to be credited, have produced no results corresponding to the vast sums appropriated. When the channel has been straightened at one point it has been lengthened at another, and obstructions or deposits in one bend have only been transferred in their removal to another. 'Sawyers' and 'planters' have in one season been reduced in number to be replaced by the succeeding one.

"The only fact clearly established, and it is one to which attention should be particularly directed as bearing with peculiar influence on

